ABSTRACT

# TAXONOMIC STATUS OF THE GENUS *MELANOPLUS*, WITH SPECIAL REFERENCE TO THE *MONTANUS* SPECIES–GROUP

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The genus *Melanoplus* is one of the most important grasshopper genera in North America because it now includes about 200 described species, several of which are serious crop pests, and many others are prevalent on rangeland. A wide variety of brachypterous and fully winged species occur in the United States. Rarely is a brachypterous species represented also by long-winged individuals except with a few species such as *Melanoplus dawsoni*. During the early pioneer period of American insect systematics many of the brachypterous species were placed in the genus *Pezotettix*, now restricted to the Old World. Long-winged species were frequently placed in *Caloptenus;* that genus is now a synonym of *Calliptamus* and likewise is limited to the Old World. Scudder's 1897 Revision of the Melanopli is a landmark in the study of the grasshoppers of this group. The species he assigned to *Melanoplus* were arranged in 28 groups which he called "series". Later, Hebard made notable contributions to the knowledge of *Melanoplus* and its allies, including a special series of papers which began in 1918 and continued for about 20 years, followed by an unpublished arrangement of the numerous species. He modified the "series" of *Melanoplus* used by Scudder and recognized 45 species-groups.

Partly because the pioneer authors placed the species of *Melanoplus* in genera which were based primarily on European species, it was then often thought that the chief relatives of *Melanoplus* occurred in the Old World. However, in 1958 James Rehn, following a life-time studying Orthoptera, concluded that *Melanoplus* and many related genera probably originated within North America. He did think that certain genera, such as *Bradynotes* and *Zubovskya* (which later was recognized in North America as a distinct genus *Boonacris)* had basic Old World relationships. Most of the genera with close Old World ties were listed by Rehn & Randell in a preliminary 1963 paper on generic grouping as members of the tribe Podismini rather than the restricted tribe Melanoplini.

Refined study of male genitalia constitutes a comparatively new tool for a more discriminating definition of the genus *Melanoplus* than has yet been produced. With the increased collecting and larger samples of species, coupled with the further advantage of automatic data processing equipment, it is now possible to make a more thorough

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investigation of the generic units at present encompassed under the single generic name *Melanoplus*. Only a few isolated species or small species-groups already have been removed, such as the former *Melanoplus militaris* (Scudder), now in the genus *Argiacris* together with 3 other species which never were placed in *Melanoplus*. *Melanoplus frigidus* (Boheman) is the basis of the genus *Bohemanella* and occurs in extreme northern North America as well as parts of northern Europa and Asia, a truly holarctic species. Some specialists have recognized the validity of *Bohemanella;* others have not done so. It is my opinion that there should be some more division of the species now comprising *Melanoplus*, but I hope that it will be done conservatively, without undue "splitting".

For some 20 years I have been interested in various species-groups of *Melanoplus* and have published papers in an attempt to clarify several of them. Unfortunately, other interests and duties have prevented a concentrated study across the whole genus and its allies such as they deserve. Intermittently for about 10 years, and including 3 collecting trips in the prime occupied area, I have studied the *montanus* species-group of *Melanoplus*. There are 8 described species concentrated in Idaho and nearby states and Canadian Provinces near Idaho. They occur typically at altitudes of about 5,000 feet (1,500 meters) or more, in openings or clearings surrounded by basically coniferous vegetation. One species, *M. daemon* Strohecker, was found by Banfill & Brusven in 1973 to feed chiefly on forbs such as *Lupinus*. In the Seven Devils area of western Idaho they considered *daemon* well adapted to "early and intermediate seral stages in the mountain-meadow region ..." The seral stages represent periods in the process of plant succession. I have no other exact data on food plants of *montanus* group species. These grasshoppers are all brachypterous, have red hind tibiae, and, althougth the male cerci of certain species show minor differences, most of the species are comparatively similar externally.

Collecting of this group has yielded what I at first regarded as about 30 segregates suspected of being distinct species. The structures of the aedeagus supply the most distinctive characters for separating the segregates. Later, in some cases after a lapse of 2 or more years, more critical study suggested that only about 18 species, including the 8 described ones, are distinct. There is some geographic overlapping of 2 or more species, but in most areas only one species of the group occurs. Members of the *indigens* species-group of *Melanoplus* (a complex of brachypterous species with greenish-gray hind tibiae and a pattern of aedeagal structures and male cerci different from the *montanus* group) frequently occur in company with one of the *montanus* group.

The 18 species may be divided roughly into subgroups, and one or two species are markedly distinct from any of the others. The illustrations (not included with this summary) prepared to accompany the discussion of these grasshoppers explain the distribution patterns and the aedeagal characters utilized. One species, *M. idaho* Hebard, is represented only by the unique male holotype, and although I went with several other collectors to the vicinity of the type locality in 1969 I was unable to find the insect. There is at least a fairly adequate sample of all other species.

I would like to emphasize that the synopsis of the *montanus* species-group which I am preparing will be preliminary in character and will not have the final results which more collecting and refined methods of analysis will eventually permit.

In addition to more collecting at points intermediate between localities where samples already have been taken, to give evidence of a cline or other type of population relationship, there is a possibility of useful work with chromosomes and with hybridization studies of laboratory cultures. At present no critical comparisons of female genitalia have been made.

The important thing is that enough collecting has been done to demonstrate the occurrence of active speciation in the *montanus* group and that the aedeagus supplies a wealth of distinctive characters. Happily, the terrain in the North American Northwest where the species occur is a wonderful place to do field work.